AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An interconnecting neural network system comprising:

a neural network unit that includes a plurality of neurons, each of the neurons outputting an excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function; and

a network control unit that constructs an artificial neural network structure by interconnecting the neurons relating to each other among the neurons in the neural network unit via a weight,

wherein each of the neurons in the neural network unit outputs an excitation strength according to the similarity between the input vectors and the centroid vectors based on the kernel function when each neuron is excited by the input vector applied from an outside, and outputs a pseudo excitation strength obtained based on an excitation strength output from the other neuron when each neuron is excited in a chain reaction to excitation of the other neuron connected to each neuron,

wherein each of the neurons in the neural network unit ~~have~~ has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that ~~the neurons handle~~ a plurality of different input vectors of auditory modality and visual modality can be handled simultaneously and independently by the neurons.

2. (Previously Presented) The interconnecting neural network system according to claim 1, wherein each neuron in the neural network unit outputs the pseudo excitation strength

and also outputs the centroid vector of each neuron when each neuron is excited in a chain reaction to the excitation of the other neuron connected to each neuron.

3. (Original) The interconnecting neural network system according to claim 1, wherein the network control unit interconnects the neurons relating to each other among the neurons in the neural network unit, based on an order of the neurons added or excited at time series in association with a plurality of input vectors applied to the neural network unit from the outside.

4. (Previously Presented) The interconnecting neural network system according to claim 1, wherein the network control unit trains the weight that connects the neurons to each other, based on the excitation strength of each neuron in the neural network unit.

5. (Previously Presented) The interconnecting neural network system according to claim 1, wherein the network control unit removes each neuron at a predetermined timing determined based on the excitation strength of each neuron in the neural network unit.

6. (Previously Presented) The interconnecting neural network system according to claim 1, wherein each neuron in the neural network unit is an intermediate layer neuron using, as the centroid vector, centroid data in a matrix form in light of time series changes, and each intermediate layer neuron is connected to an output layer neuron that outputs a change in the excitation strength output from each intermediate layer neuron at time series.

7. (Previously Presented) The interconnecting neural network system according to claim 1, wherein the kernel function employed in each neuron in the neural network unit includes a radial basis function.

8. (Currently Amended) A method of constructing an interconnecting neural network structure, the method comprising the steps of:

preparing an artificial neural network structure including a plurality of neurons, each of the neurons outputting an excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function, the neurons relating to each other interconnected in the artificial neural network structure via a weight; and

training the weight that connects the neurons to each other, based on the excitation strength of each neuron,

wherein each of the neurons in the artificial neural network structure ~~have~~ has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that ~~the neurons handle~~ a plurality of different input vectors of auditory modality and visual modality can be handled simultaneously and independently by the neurons.

9. (Original) The method according to claim 8, wherein, in the step of preparing the artificial neural network structure, the neurons relating to each other are interconnected in the

artificial neural network structure based on an order of the neurons added or excited at time series in association with a plurality of input vectors applied from an outside.

10. (Previously Presented) The method according to claim 8, further comprising a step of removing each neuron at a predetermined timing determined based on the excitation strength of each neuron.

11. (Previously Presented) The method according to claim 8, wherein the kernel function employed in each neuron includes a radial basis function.

12. (Original) A computer readable recording medium storing an interconnecting neural network structure construction program that allows a computer to execute the method according to claim 8.

13. (Currently Amended) A method of constructing a self-organizing neural network structure including a plurality of neurons, each of the neurons outputting an excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function, the neurons relating to each other being autonomously connected in the self-organizing neural network structure based on the input vector, the method comprising:

a first step of adding a neuron, which has input vectors as centroid vectors for a kernel function, into the self-organizing neural network structure as a new neuron based on input vectors that is input first from an outside; and

a second step of repeating the following processings (a) to (c), each of the processings being based on input vectors that is an n^{th} input vector from the outside, where n is an integer equal to or greater than 2:

(a) the processing of calculating excitation strengths of all the neurons in the self-organizing neural network structure based on the n^{th} input vector input from the outside;

(b) the processing of adding a neuron, which has the n^{th} input vector as a centroid vector for a kernel function, into the self-organizing neural network structure as a new neuron in case that it is determined by the processing (a) that there is no neuron excited such that the excitation strength thereof exceeds a predetermined threshold, among one or a plurality of neurons in the self-organizing neural network structure; and

(c) the processing of performing both of or one of formation of a weight that connects the neurons, and training of the formed weight based on the excitation strengths of the neurons in the self-organizing neural network structure;

wherein each of the neurons in the self-organizing neural network structure ~~have~~ has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that ~~the neurons handle~~ a plurality of different input vectors of auditory modality and visual modality can be handled simultaneously and independently by the neurons.

14. (Original) The method according to claim 13, wherein, in the second step, a processing (d) of removing a neuron determined to be unnecessary based on the excitation strengths of the neurons in the self-organizing neural network structure is further performed.

15. (Previously Presented) The method according to claim 13, wherein each of the neurons in the self-organizing neural network structure holds a class label relating to a final output, and, in the processing (c) in the second step, only in case that the class label held by each neuron in the self-organizing neural network structure is identical, both of or one of the formation of the weight that connects the neurons, and the training of the formed weight is performed based on the excitation strengths of the neurons.

16-17. (Cancelled)

18. (Previously Presented) The method according to claim 13, wherein the kernel function employed in each neuron includes a radial basis function.

19. (Original) A computer readable recording medium storing an interconnecting neural network structure construction program that allows a computer to execute the method according to claim 13.

20. (Currently Amended) An interconnecting neural network system comprising:

a plurality of intermediate layer neurons, each of the intermediate layer neurons outputting an excitation strength according to a similarity between input vectors and centroid vectors based on a kernel function, and each of the intermediate layer neurons using centroid data in a matrix form in light of time series changes as the centroid vector; and

an output layer neuron connected to each of the intermediate layer neurons and outputting a change in the excitation strength output from each intermediate layer neuron at time series,

wherein each of the neurons ~~have~~ has a plurality of modalities different from one another, the plurality of modalities of the neurons including auditory modality and visual modality so that ~~the neurons handle~~ a plurality of different input vectors of auditory modality and visual modality can be handled simultaneously and independently by the neurons.

21. (Previously Presented) The interconnecting neural network system according to claim 20, wherein the kernel function employed in each intermediate layer neuron includes a radial basis function.